

## ABSTRACT OF THE DISCLOSURE

A medical diagnostic ultrasonic imaging system acquires receive beams from spatially distinct transmit beams. The receive beams alternate in type between at least first and second types across the region being imaged. The first and second types of receive beams differ in at least one scan parameter other than transmit and receive line geometry, and can for example differ in transmit phase, transmit or receive aperture, system frequency, transmit focus, complex phase angle, transmit code or transmit gain. Receive beams associated with spatially distinct ones of the transmit beams (including at least one beam of the first type and at least one beam of the second type) are then combined. In this way, many two-pulse techniques, including, for example, phase inversion techniques, synthetic aperture techniques, synthetic frequency techniques, and synthetic focus techniques, can be used while substantially reducing the frame rate penalty normally associated with such techniques.